Wiper/Washer Systems - New Beetle

DESCRIPTION & OPERATION

FRONT WIPER

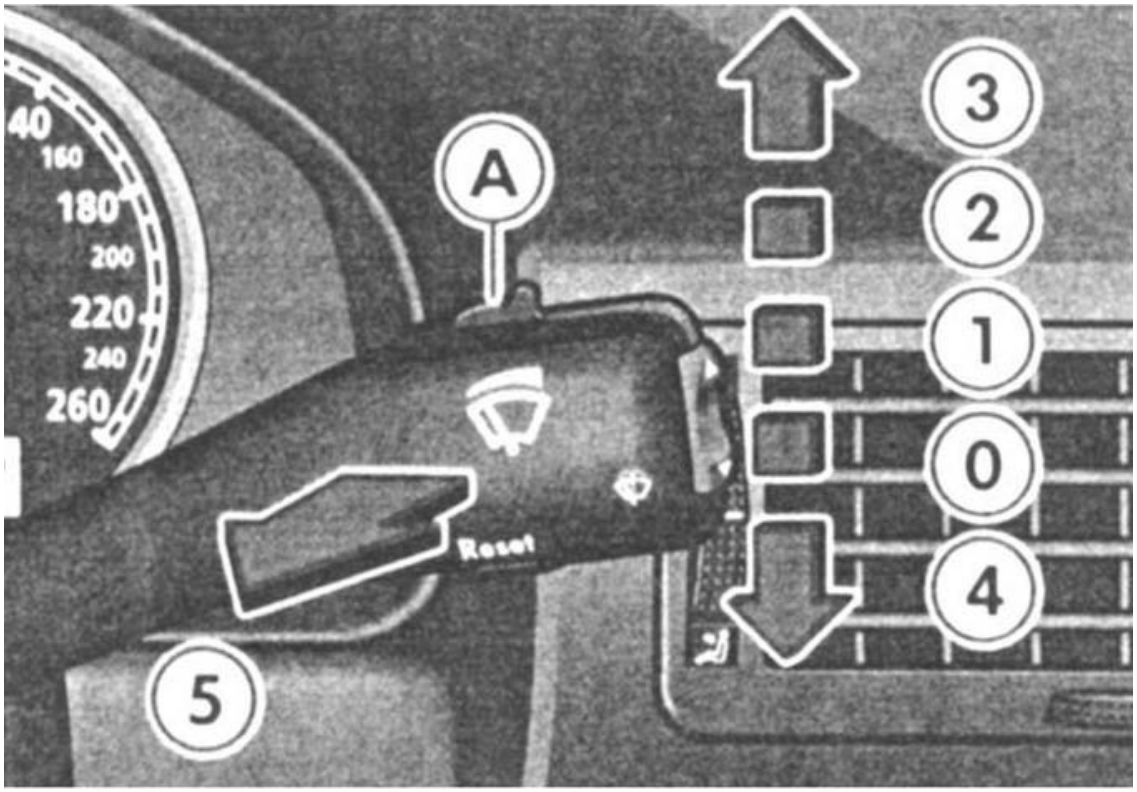
New Beetle is equipped with a 2-speed front wiper motor with intermittent and one-tap function capabilities. Front wiper and washer operations are controlled from the steering column mounted wiper/washer switch. Intermittent timing for wipers is controlled by the wiper/washer intermittent relay. Wiper and washer systems work only when the ignition is on. The heated washer jets do not have a separate switch. Heated washer jet operation is dependent on the outside temperature.

WIPER OPERATION

The wiper switch is controlled by lever built into the combination switch. See **Fig. 1** .

Wiper switch positions are:

- Position 0 - Wiper OFF
- Position 1 - Intermittent
- Position 2 - Low Speed
- Position 3 - High Speed
- Position 4 - One-Tap Wiping
- Position 5 - Automatic Wiper/Washer (Pulling forward and holding wiper switch will cause wipers to operate until lever is released. When lever is released, wipers will continue to operate for about 4 seconds.)



A - Rain Sensor Sensitivity Switch
0 - Wiper OFF Position
1 - Intermittent Wiping Position
2 - Low Wiper Speed Position
3 - High Wiper Speed Position
4 - One-Tap Wiping Position
5 - Automatic Wiper/Washer Position

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Fig. 1: Identifying Wiper & Washer System Switch Positions
Courtesy of VOLKSWAGEN UNITED STATES, INC.

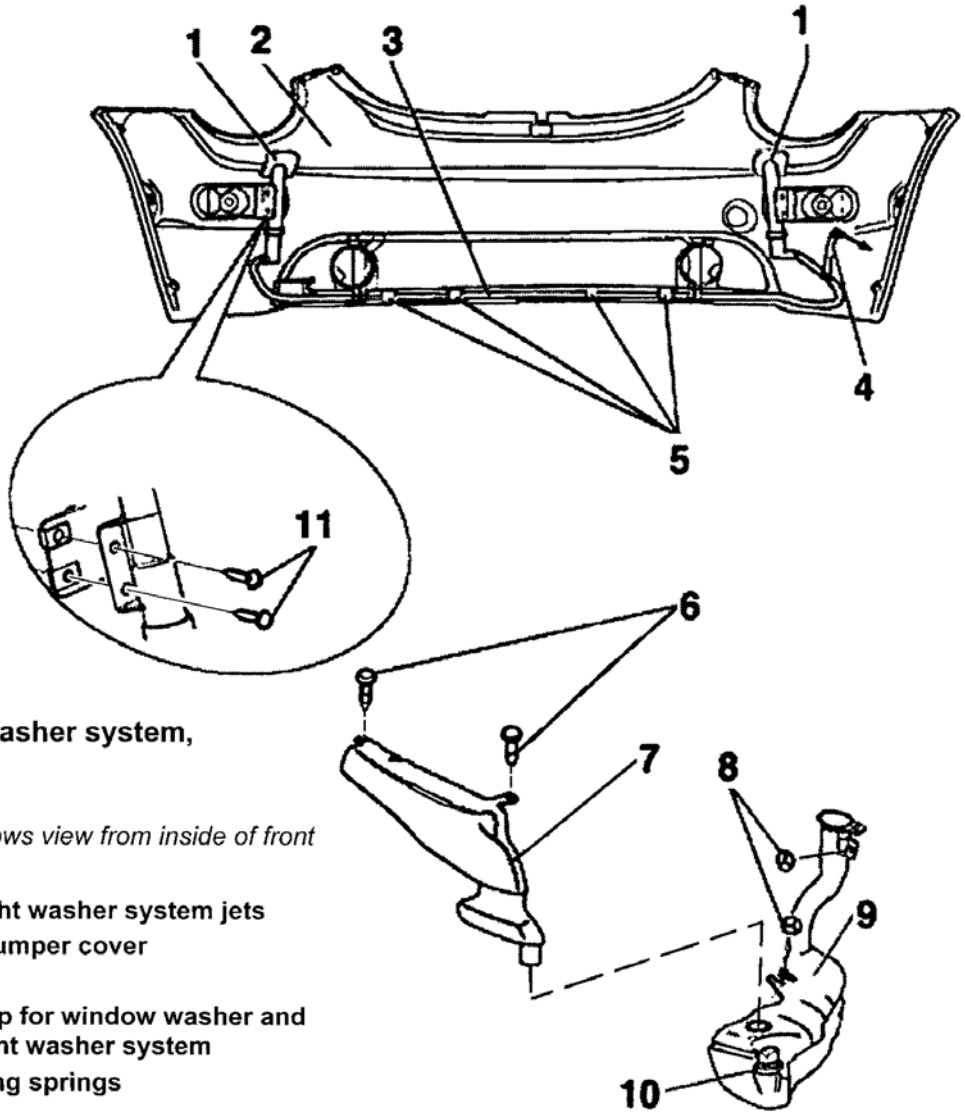
HEADLIGHT WASHER

Headlight washers, if equipped, operate with windshield washers.

COMPONENT LOCATIONS

COMPONENT LOCATIONS

Component	Location	See Figure No.
Headlight Washer Components	Behind & Attached To Front Bumper	**Fig. 2**
Washer Fluid Reservoir	In Engine Compartment	.....
Washer Pump	Attached To Washer Fluid Reservoir	.....
Windshield Washer Jets	Behind Cowl Trim	.....
Windshield Wiper Motor	Attached To Wiper Assembly	**Fig. 3**
Wiper Assembly	Under Cowl At Firewall	**Fig. 3**
Wiper/Washer Switch	On Steering Column	**Fig. 1** .
Wiper/Washer Intermittent Relay	In 13-Fold Auxiliary Relay Panel Under Driver's Side Of Dash	**Fig. 4**



Headlight washer system, assembly

Note:

Illustration shows view from inside of front bumper cover.

1 - Headlight washer system jets

2 - Front bumper cover

3 - Hose

4 - To pump for window washer and headlight washer system

5 - Retaining springs

6 - Screws

- 5 Nm

7 - Headlight washer system reservoir

- Capacity: 2.5 liters

8 - Hex nut, M6

- 2 Nm

9 - Windshield washer system reservoir

10 - Windshield and headlight washer system pump

11 - Screws

- 3.5 Nm

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Fig. 2: Identifying Headlight Washer Assembly Components
Courtesy of VOLKSWAGEN UNITED STATES, INC.

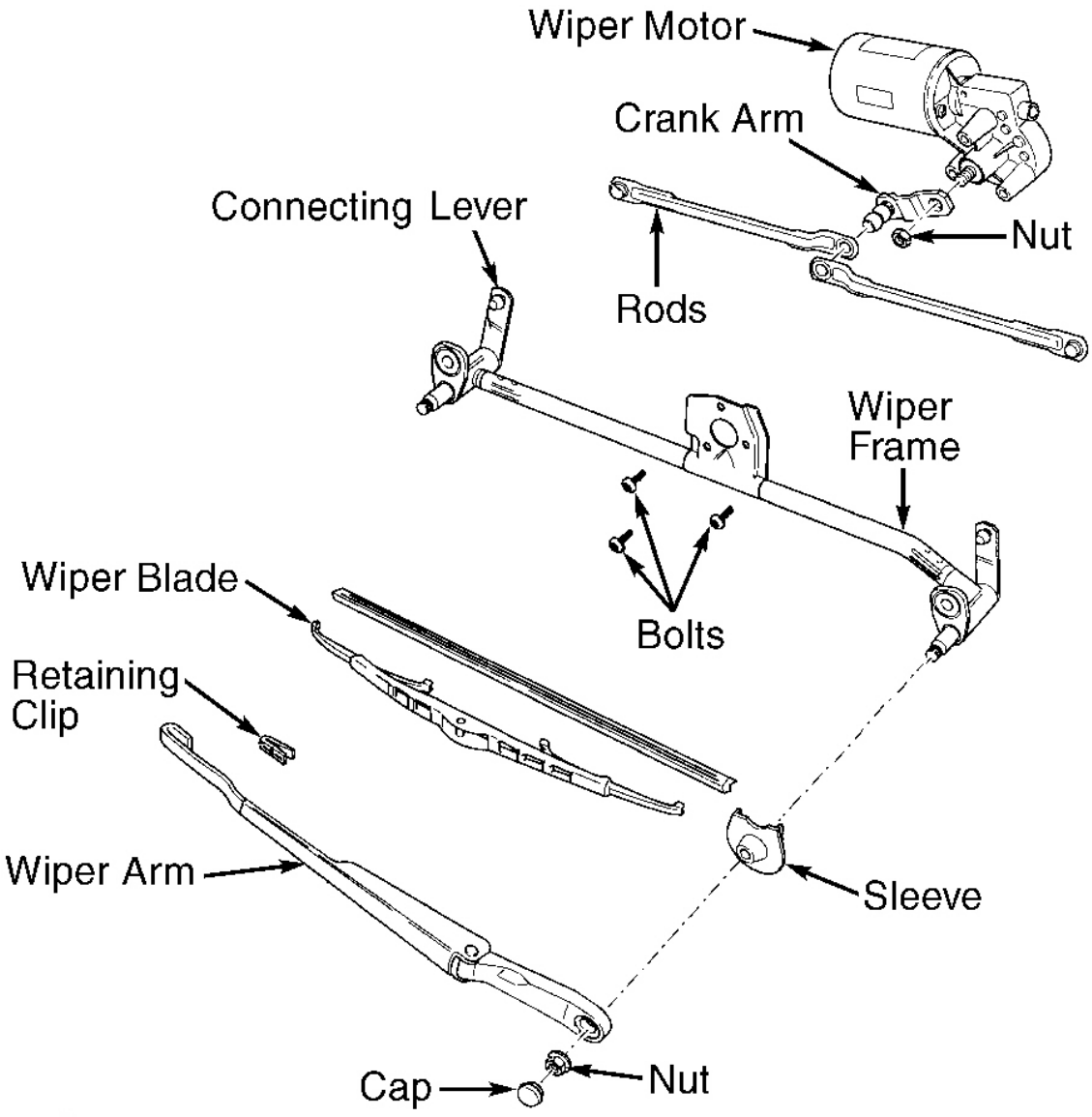
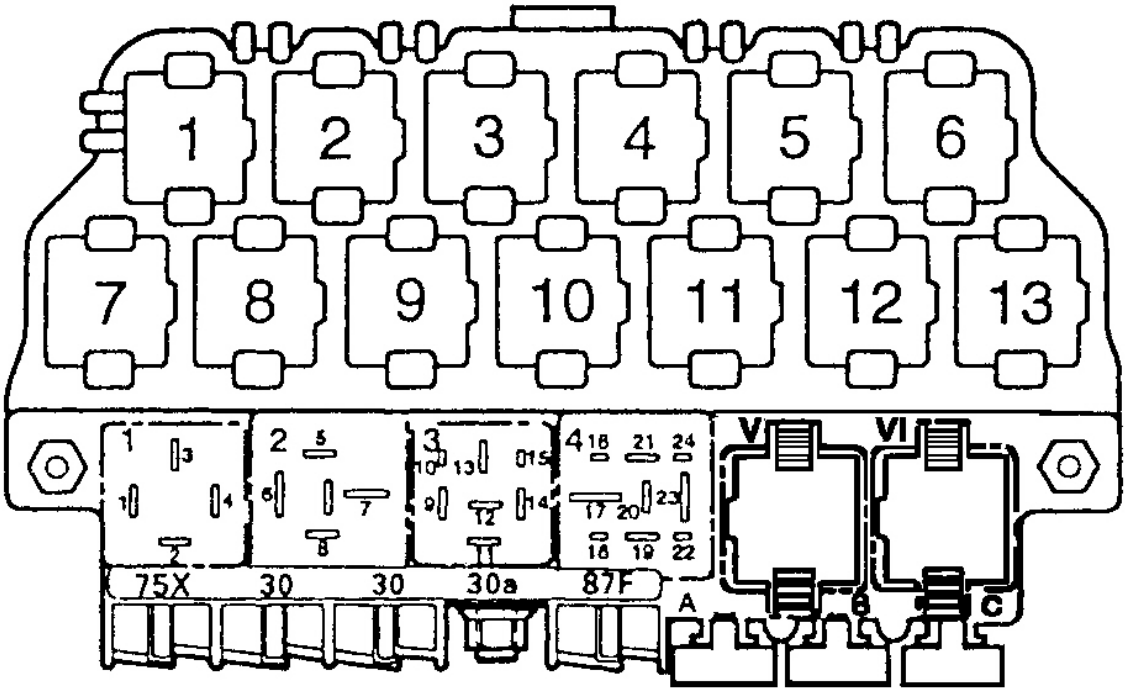


Fig. 3: Exploded View Of Front Wiper Motor Assembly (Beetle)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

NOTE: Relay panel is behind lower instrument panel trim on driver's side.



Relay location on the thirteenfold auxiliary relay panel, above relay panel:

7 Fog Light Relay (381)

8 Daytime Running Lights Change-over Relay (173)

10 Fog Light Relay (381)

12 Starting Interlock Relay (alarm system) (186)

13 Starting Interlock Relay (clutch position) (204)

Relay panel:

1 Dual Horn Relay (204)

2 Load Reduction Relay (213)

3 Wiper/Washer Intermittent Relay (317)

Fig. 4: Locating Wiper/Washer Intermittent Relay
Courtesy of VOLKSWAGEN UNITED STATES, INC.

ADJUSTMENTS

WIPER BLADE PARK POSITION

To adjust wiper blade park position, ensure wiper motor is at park position. Position wiper blade(s) above lower edge of windshield as specified. See **WIPER BLADE PARK POSITION SPECIFICATIONS** table. Tighten wiper arm nut to 15 ft. lbs. (20 N.m).

WIPER BLADE PARK POSITION SPECIFICATIONS

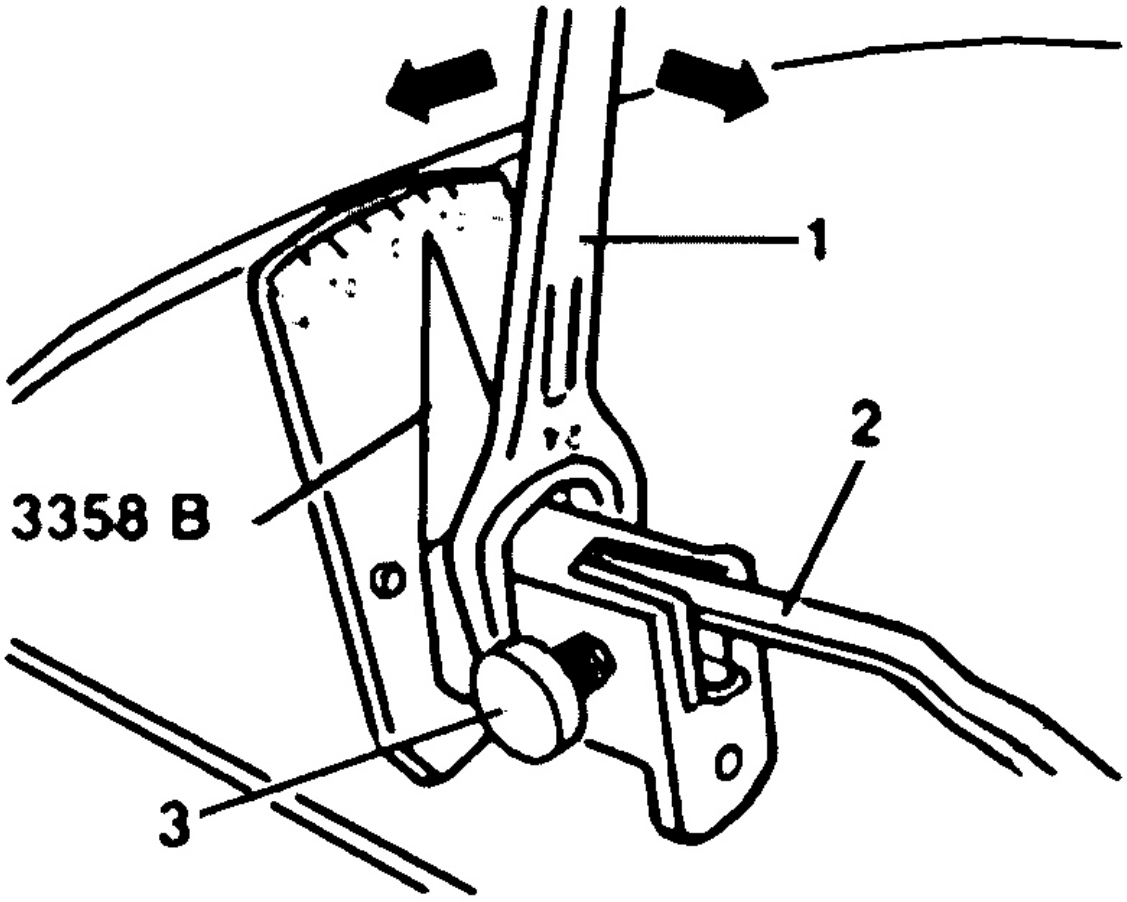
Application	In. (mm)
Beetle	(1) 0.79 (20)
(1) Specification is measured from each end of both wiper blades. Distance between wiper blades at middle of windshield is approximately 0.75-1.20" (20-30 mm).	

WIPER BLADE CONTACT ANGLE

NOTE: Check wiper blade contact angle on conventional blades, only if wiper blades skip, shudder, or make noise.

Checking & Adjusting

1. Bring wiper arm to park position.
2. Remove wiper blade.
3. Insert wiper arms Setting Device (3358B) into wiper arm and secure with lock screw. See **Fig. 5** .
4. Check contact angle. Contact angle should be as follows:
   - Driver's side - -3°
   - Passenger's side - -3°
   - Tolerance - +/-2°
5. To adjust contact angle, place 24 mm open end wrench on setting device and adjust wiper arm to specifications (arrows).
6. Release wiper arm from setting device and then re-secure with lock screw.
7. Compare adjustment readout with specification. If necessary repeat adjustment.
8. Remove setting device and install wiper blade.
9. Check that wiper system operates without skipping.



1. 24-mm Open End Wrench
2. Wiper Arm
3. Lock Screw

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Fig. 5: Checking & Adjusting Wiper Blade Contact Angle
Courtesy of VOLKSWAGEN UNITED STATES, INC.

WINDSHIELD WASHER JETS

CAUTION: Washer jets must not be cleaned opposite to the spray direction (e.g. compressed air blown backwards though jet).

Checking & Adjusting (Up To 08/99 Models)

Turn eccentric screw on jet in direction of arrows to raise spray pattern. Turn in opposite direction to lower pattern. See **Fig. 6** .

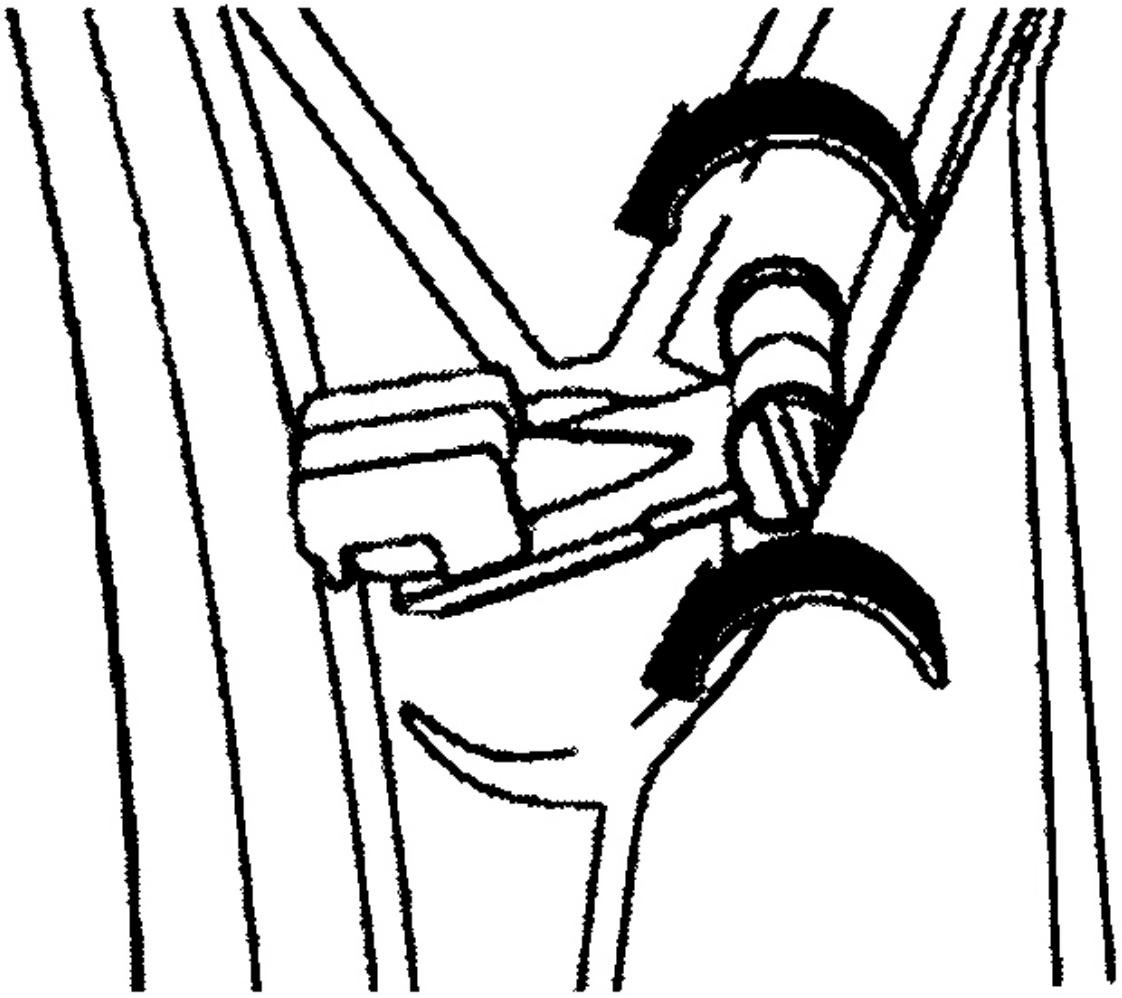

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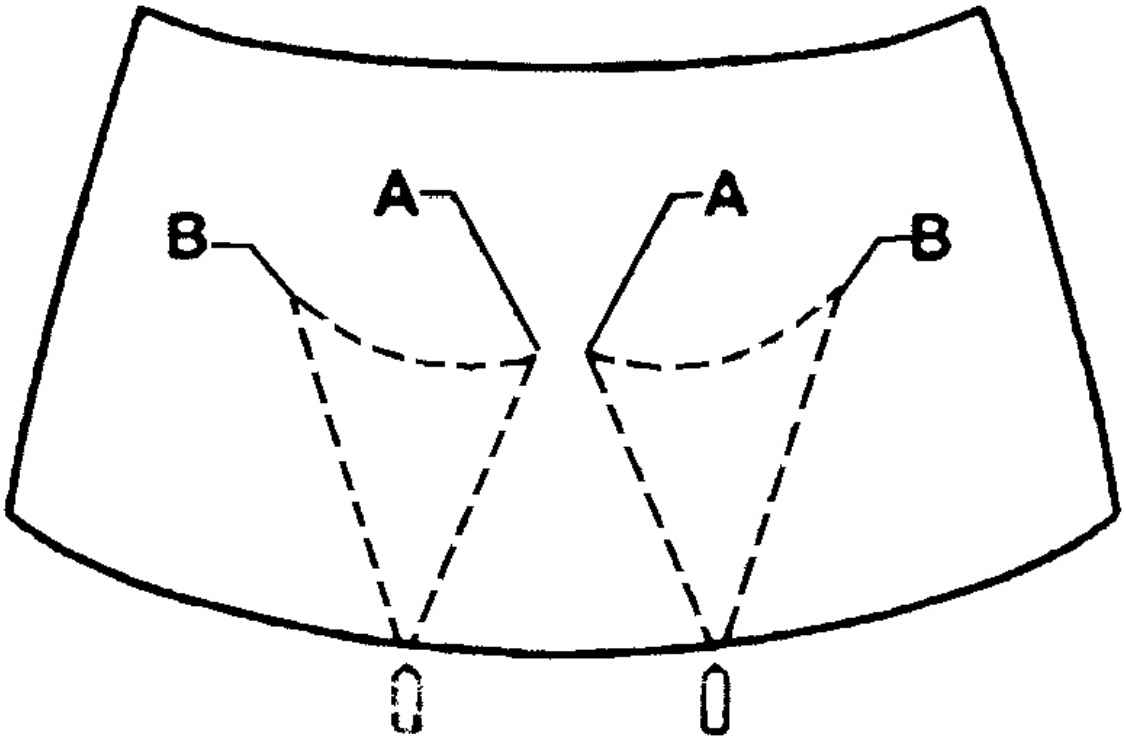
Fig. 6: Adjusting Windshield Washer Jets Using Eccentric Screw
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Checking & Adjusting (09/99 And Up Models)

Washer jet spray height and lateral position are preset in production. However, small height adjustments are possible. Both spray fields are defined with points "A" and "B". See **Fig. 7** . Distance between points "A" and "B" and upper windshield are indicated in a straight line as in illustration. Move spray jet in direction of arrow with finger. See **Fig. 8** .



Point	Distance
A	480 mm (18.8 in.)
B	400 mm (15.7 in.)

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Fig. 7: Adjusting Washer Jets (1 Of 2)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

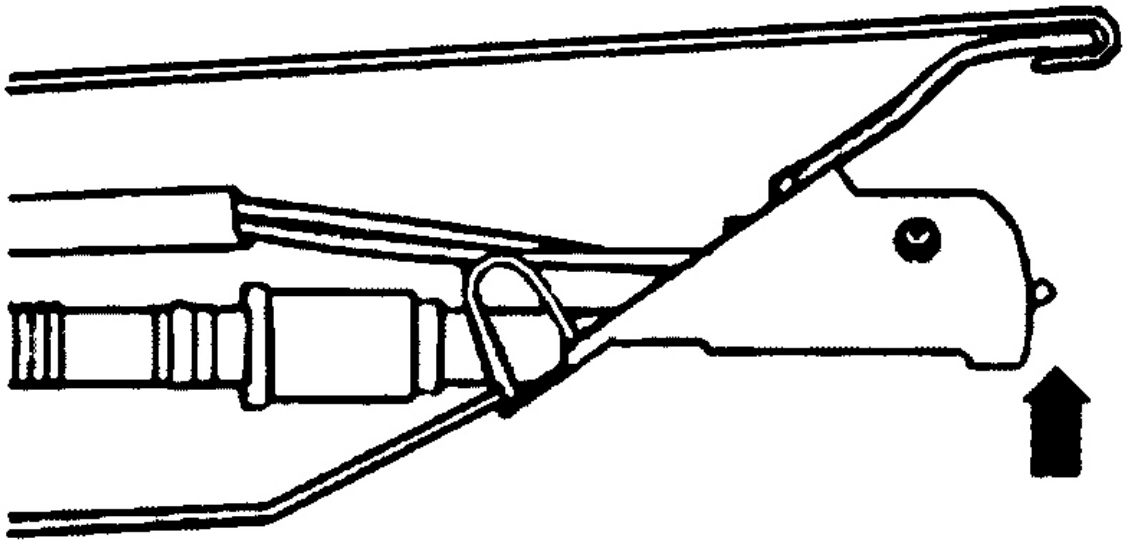

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Fig. 8: Adjusting Washer Jets (2 Of 2)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

TROUBLE SHOOTING

FRONT WIPER/WASHER SYSTEM

1. Ensure fuse No. S224 (20-amp) is okay. Fuse is located in position No. 24 in instrument panel fuse box, located in dashboard endcap (far left end of dash). Wipers are turned off and wiper arms are in park position. See **WIPER BLADES** under ADJUSTMENTS. Ensure speedometer is operating properly.
2. Turn ignition off. Remove lower instrument panel cover. Remove wiper/washer intermittent relay. Relay is located in 13-fold auxiliary relay panel double-relay-socket positions "V" and "VI". See **Fig. 4** .
3. Check for continuity between battery ground and wiper/washer intermittent relay socket connector No. 17 (Brown wire). If continuity exists, go to next step. If continuity does not exist, repair Brown wire between wiper/washer intermittent and battery ground connection. See **WIRING DIAGRAMS** .
4. Using Connector Test Kit (VW1594), measure voltage between battery ground and wiper/washer intermittent relay socket connector terminal No. 13 (Black/Gray wire). If battery voltage is present, go to next step. If battery voltage is not present, check for open or shorted condition in Black/Gray wire between wiper/washer intermittent relay and fuse No. 24. See **WIRING DIAGRAMS** . If problem is found, repair as necessary.
5. Turn ignition off. Reinstall wiper/washer intermittent relay. Lift wiper/washer switch lever to position No. 2 (low wiper speed). Turn ignition on. If wiper does not operate at low speed, go to next step. If wiper operates at low speed, go to step 8 .
6. Turn ignition off. Remove wiper/washer intermittent relay from auxiliary relay panel. Measure voltage between wiper/washer intermittent relay socket connector terminals No. 8 (White/Green wire) and No. 17 (Brown wire). See **WIRING DIAGRAMS** . If approximately zero volts is present, go to next step. If battery voltage is present, go to step 11 .
7. Check for open or shorted condition in White/Green wire between wiper/washer intermittent relay socket

connector terminal No. 8 and wiper/washer switch connector terminal No. 1. If problem is found, repair White/Green wire as necessary. If no problem is found, replace wiper/washer switch. See **COMBINATION SWITCH** under REMOVAL & INSTALLATION.

8. Turn ignition off. Reinstall wiper/washer intermittent relay. Lift wiper/washer switch lever to position No. 3 (high wiper speed). Turn ignition on. If wiper does not operate at high speed, go to next step. If wiper operates at high speed, go to step 12 .
9. Turn ignition off. Remove wiper/washer intermittent relay. Turn ignition on. Lift wiper/washer switch lever to position No. 3 (high wiper speed), measure voltage between ground and wiper/washer intermittent relay socket connector terminal No. 13 (Black/Gray wire). See **WIRING DIAGRAMS** . If approximately zero volts is present, go to next step. If approximately battery voltage is present, go to step 11 .
10. Check for open or shorted condition in Green/Gray (or Green/Yellow) wire between wiper/washer intermittent relay socket connector terminal No. 2 and wiper/washer switch connector terminal No. 6. If problem is found, repair Green/Gray wire as necessary. If no problem is found, replace wiper/washer motor. See **WIPER ASSEMBLY** under REMOVAL & INSTALLATION.
11. Turn ignition off. Remove wiper/washer intermittent relay from auxiliary relay panel. Check for continuity between wiper/washer intermittent relay socket connector terminal No. 17 (Brown wire) and terminals No. 4 (Green wire), No. 5 (Green/Gray or Green/Yellow wire) and No. 11 (Green/Black wire). See **WIRING DIAGRAMS** . If continuity exists at all circuits go to next step. If continuity does not exist, check suspect circuit. If all circuits are okay, replace wiper motor. See **WIPER ASSEMBLY** under REMOVAL & INSTALLATION.
12. Turn ignition off. Remove wiper/washer intermittent relay. Turn ignition on. Lift wiper/washer switch lever to position No. 1 (intermittent). Measure voltage between wiper/washer intermittent relay socket connector terminals No. 12 (Brown/Black wire) and No. 17 (Brown wire). If approximately zero volts is present, go to next step. If battery voltage is present, go to step 14 .
13. Check for open or shorted condition in Brown/Black wire between wiper/washer intermittent relay and wiper/washer switch connector terminal No. 7. See **WIRING DIAGRAMS** . If problem is found, repair Brown/Black wire as necessary. If no problem is found, go to next step.
14. Turn ignition off. Reinstall wiper/washer intermittent relay. Turn ignition on. Lift wiper/washer switch lever to position No. 1 (intermittent). Measure voltage between wiper/washer intermittent relay socket connector terminals No. 12 (Brown/Black wire) and No. 17 (Brown wire). If approximately zero volts is present, go to next step. If battery voltage is present, go to step 16 .
15. Check for and repair open or shorted condition in Brown/Black wire between wiper/washer intermittent relay and wiper/washer switch connector terminal No. 7. See **WIRING DIAGRAMS** .
16. Turn ignition off. Measure resistance between wiper/washer intermittent relay socket connector terminals No. 3 (Green/Violet wire) and No. 17 (Brown wire). Move intermittent wiper regulator to each of 4 positions. See **WIPER INTERMITTENT REGULATOR RESISTANCE (BEETLE)** table. If resistance is not as specified, go to next step. If resistance is as specified, replace wiper/washer intermittent relay.
17. Check for open, high resistance or shorted condition in Green/Violet wire between wiper/washer intermittent relay socket connector terminal No. 3 and windshield wiper intermittent regulator connector terminal No. 5. Also, check for open, high resistance or shorted condition in Brown wire between windshield wiper intermittent regulator connector terminal No. 6 and ground connection. See **WIRING DIAGRAMS** . If problem is found, repair as necessary. If wires are okay, replace windshield wiper intermittent regulator.

WIPER INTERMITTENT REGULATOR RESISTANCE (BEETLE)

Relay Position (1)	Resistance (Ohms)
1	2000
2	4000
3	8000
4	16,000

(1) Measured between wiper/washer intermittent relay J31 socket connector terminals No. 3 (Green/Violet wire) and No. 17 (Brown wire).

REMOVAL & INSTALLATION

WARNING: Vehicles are equipped with air bag supplemental restraint system. Before attempting ANY repairs involving steering column, instrument panel or related components, see SERVICE PRECAUTIONS and DISABLING & ACTIVATING AIR BAG SYSTEM (or AIR BAG SAFETY PRECAUTIONS) in appropriate AIR BAG RESTRAINT SYSTEMS article in RESTRAINTS.

CAUTION: When battery is disconnected, vehicle computer and memory systems may lose memory data. Driveability problems may exist until computer systems have completed a relearn cycle. See COMPUTER RELEARN PROCEDURES article in GENERAL INFORMATION before disconnecting battery.

CAUTION: Before disconnecting battery, obtain radio anti-theft code. If wrong code is entered into radio after power is restored, radio will become inoperable.

COMBINATION SWITCH

NOTE: For windshield wiper switch removal and installation procedures, see COMBINATION SWITCH under REMOVAL & INSTALLATION in appropriate STEERING COLUMN SWITCHES article.

FRONT BUMPER

Front bumper must be removed to access headlight washer components or fluid reservoir. Use illustration to aid in removal of front bumper. See **Fig. 9** .

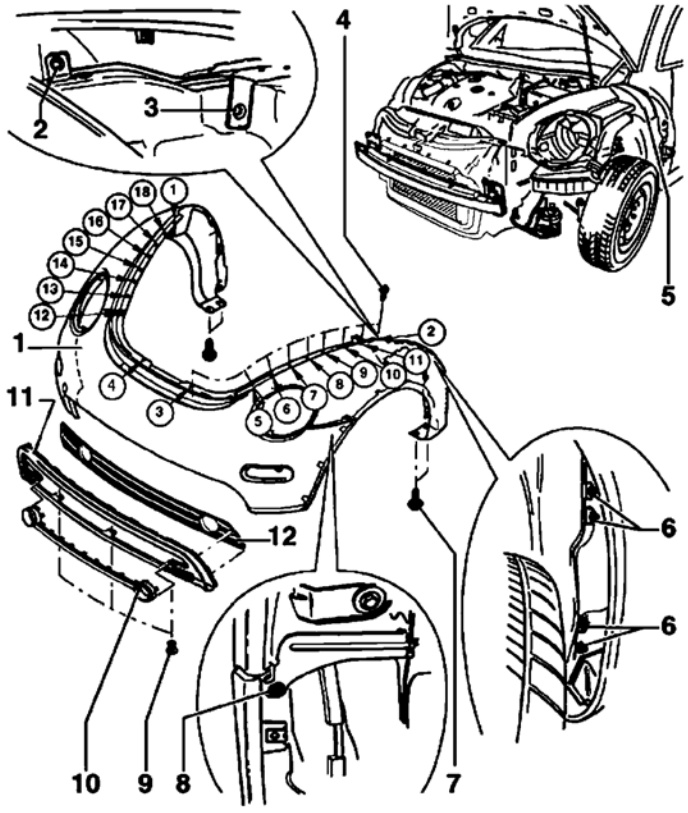
Front end, assembly overview

Note:

- *The front fenders and the front bumper cover can only be removed together from the vehicle as one assembly and are therefore called "front end."*
- *It is essential that the tightening sequence of the bolts/screws -4- is observed to make sure conciseness of gaps/mating lines etc.*
- *The front end must be installed free of stress.*

1 - Front end

- Removing:
  - Remove wheel housing liners .
  - Remove bolts/screws -2-, -3- and -8- in the wheel housing.
  - Disconnect connections for turn signals and fog lights.
  - Disconnect hose connections on models with headlight washer system.
  - Remove nuts -6-.
  - Remove spreader clips -9-.
  - Remove bolts/screws -4- and -7-.
  - Pull front end on left and right-hand sides outward off the threaded studs and carry away forward with the aid of an assistant.
- Installing:
  - Before installing the front end, cover contact surfaces with an anti-abrasive film ⇒ Page 50-13 , item 11 or check the condition of the existing anti-abrasive film.
  - When installing the front end, make sure insulation -5- on longitudinal members is seated correctly and make sure front end locks correctly on the headlight bracket.



2 - Bolt/screw
- With nut.
- 6 Nm.

3 - Combi-bolt/screw
- 6 Nm.

4 - Bolt/screw
- Qty. 18.
- 7.5 Nm.
- Installed with locking compound D 185 400 A2.
- Note tightening sequence.

5 - Insulation

6 - Hex nut
- 6 Nm.

7 - Bolt/screw
- 7.5 Nm.
- Qty. 4.
- Installed with locking compound D 185 400 A2.

8 - Bolt/screw
- Qty. 2.
- Installed with locking compound D 185 400 A2.

9 - Spreader clip
- Qty. 3.
- To remove press spreader pin through clip.

10 - Trim

11 - Front spoiler

12 - Air grille

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Fig. 9: Removing & Installing Front Bumper
Courtesy of VOLKSWAGEN UNITED STATES, INC.

HEADLIGHT WASHER JETS

1. Remove front bumper. See **FRONT BUMPER** .
2. Remove screws (4) from speed nuts (5). See **Fig. 10** . Unclip headlight washer system hose (3) from hose clips (2). Pull hose (3) from spray jet carrier (1).
3. Installation is reverse of removal procedure. Once installation is complete, bleed headlight washer system by operating system several times.

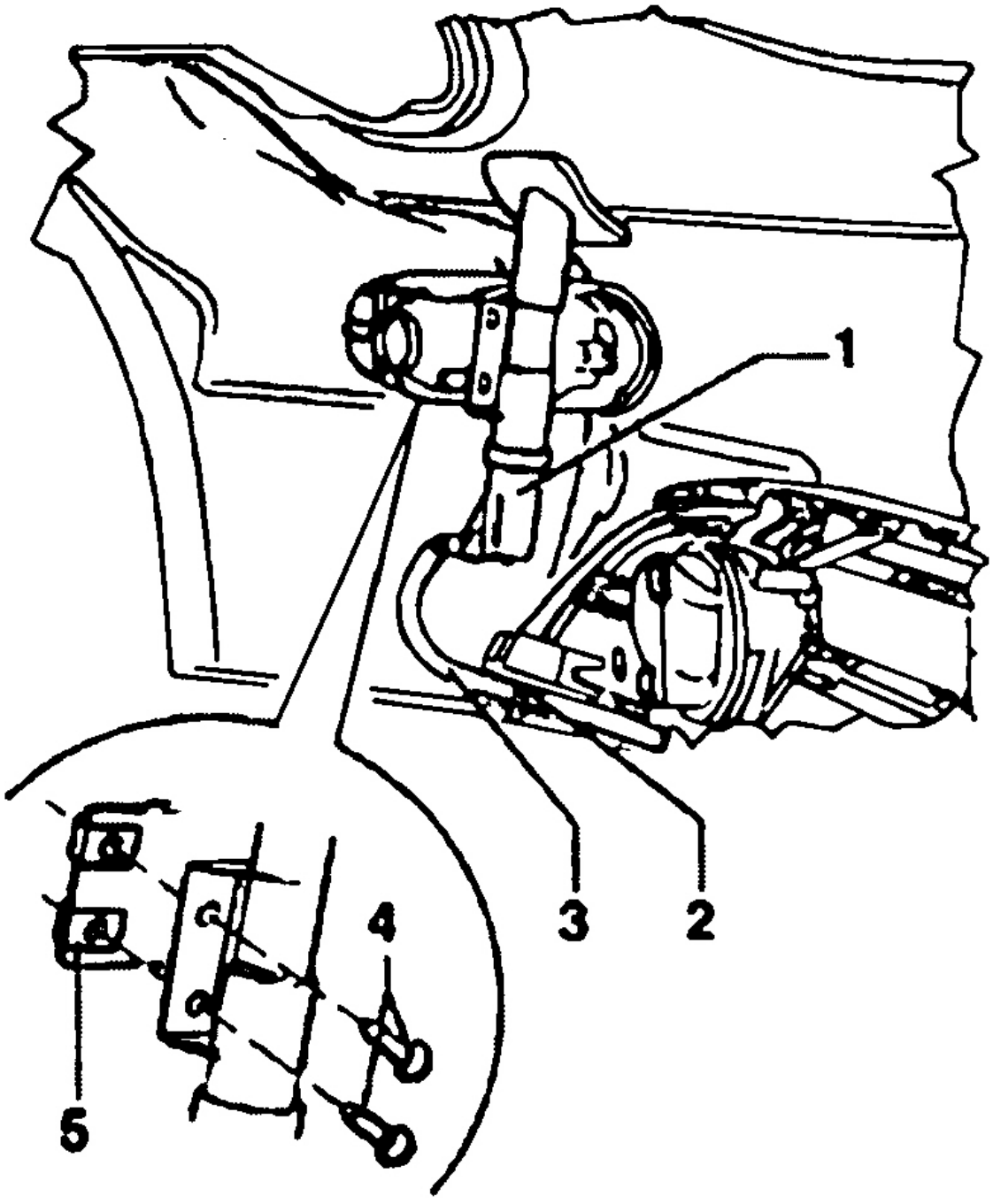

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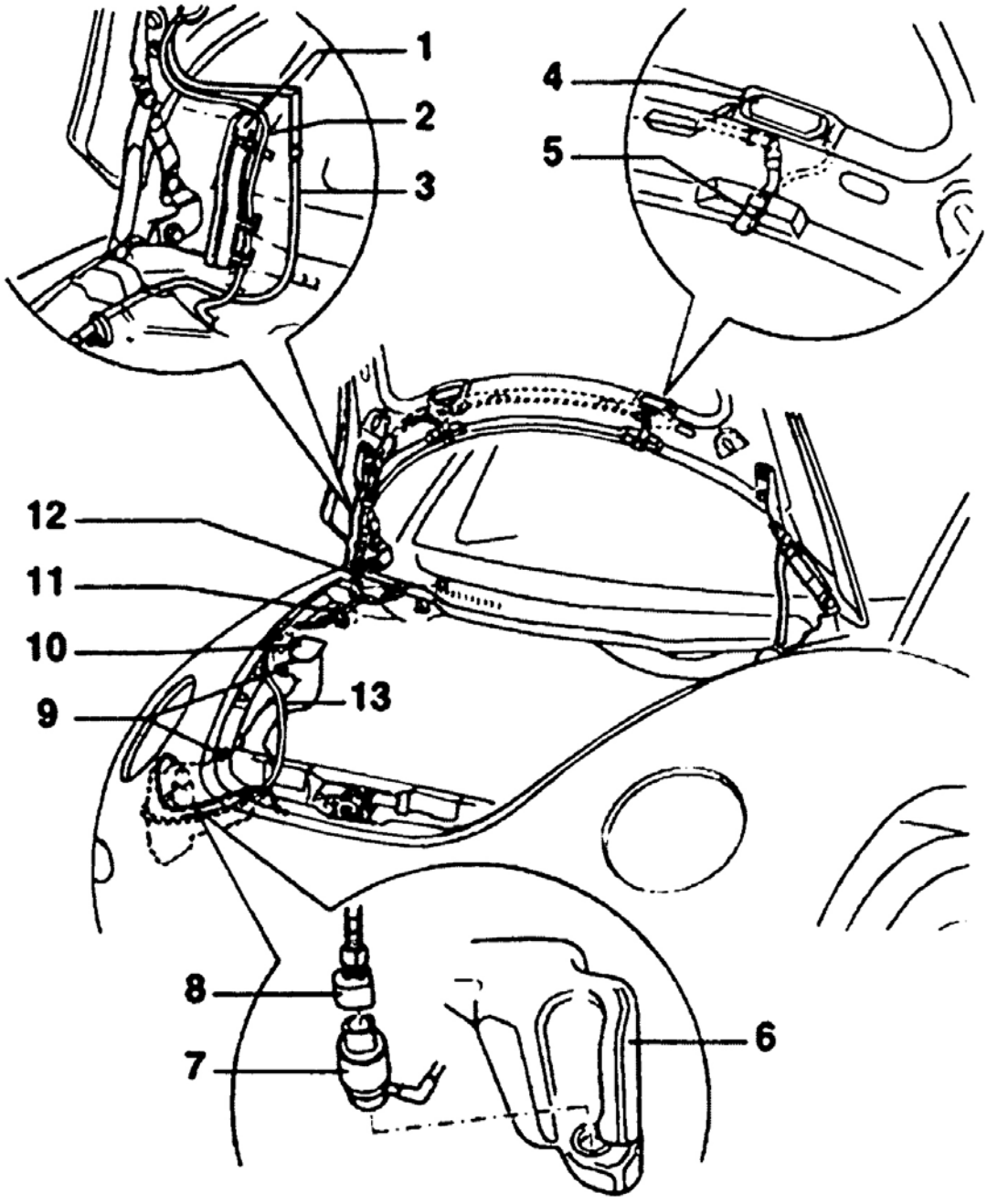
Fig. 10: Removing & Installing Headlight Washer Jets
Courtesy of VOLKSWAGEN UNITED STATES, INC.

WASHER FLUID RESERVOIR

Removal & Installation

Washer reservoir is accessed by removing right front inner fender lining. See **Fig. 11** and **Fig. 12** .



Washer system

WIndshield washer system, assembly

1 - **Securing clip**
2 - **Wiring harness for heated washer jets**
3 - **Hose**
4 - **Cover cap**
♦ With connectors for heated washer nozzles
5 - **Jets**
6 - **Windshield washer system reservoir**
7 - **Windshield washer system pump**
♦ Pull pump upward off rubber grommet
8 - **Harness connector**
9 - **Securing bolts**
10 - **Container cap**
11 - **Transfer piece**
12 - **Harness connector for heated washer nozzles**

Fig. 11: Exploded View Of Washer System
Courtesy of VOLKSWAGEN UNITED STATES, INC.

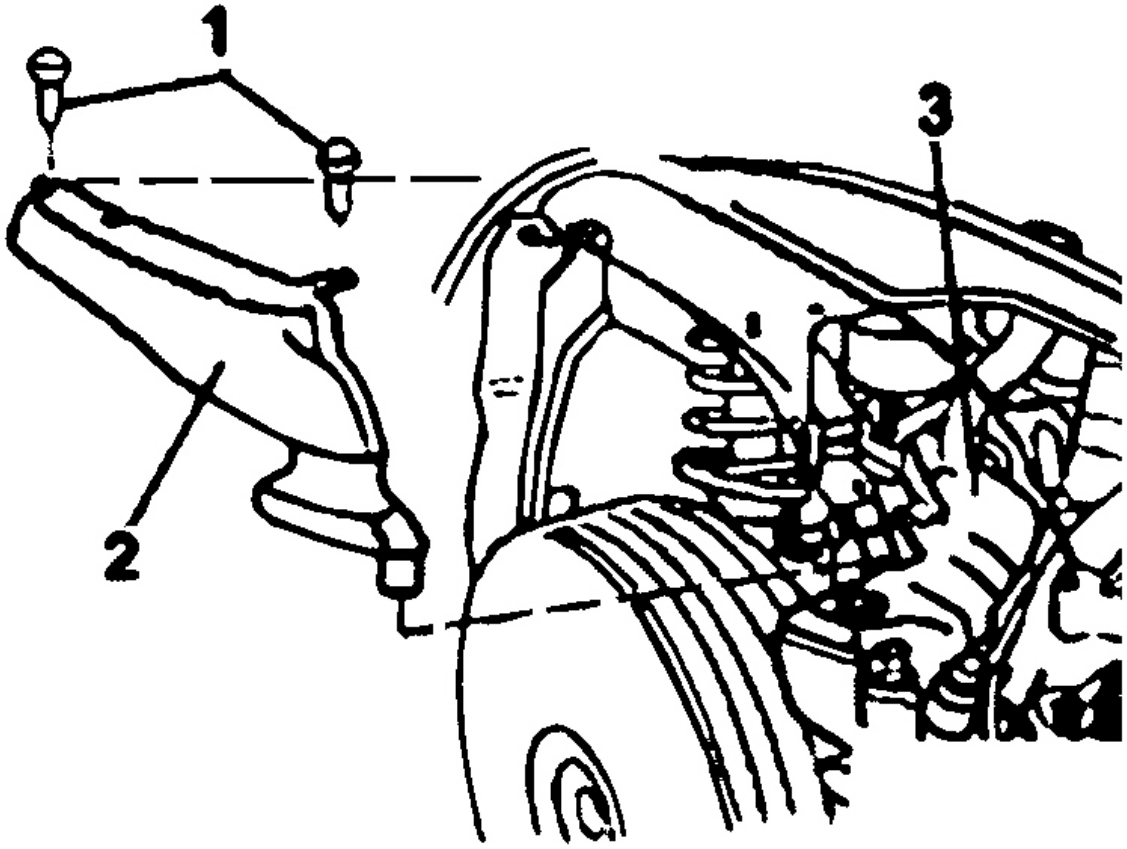


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Fig. 12: Removing & Installing Washer Fluid Reservoir
Courtesy of VOLKSWAGEN UNITED STATES, INC.

WIPER ASSEMBLY

Removal

1. Remove wiper arms. See **WIPER ARMS** .
2. Open hood. Remove cowl panels. The cowl panel is attached to a window guide underneath the windshield. Pull up plenum panel rubber gasket and remove. Carefully pry cowl panel off in upward direction.
3. Remove hex screws (arrows) and pull plenum panel divider (1) slightly forward. See **Fig. 13** .
4. Disconnect wiper motor harness connector. Remove wiper assembly mounting bolts. See **Fig. 14** . Remove wiper assembly.
5. To remove wiper motor from frame, pry rods off wiper crank using a large screwdriver. Remove crank retaining nut and remove crank. Remove 3 bolts retaining wiper motor and remove wiper motor from wiper frame. See **Fig. 3** .

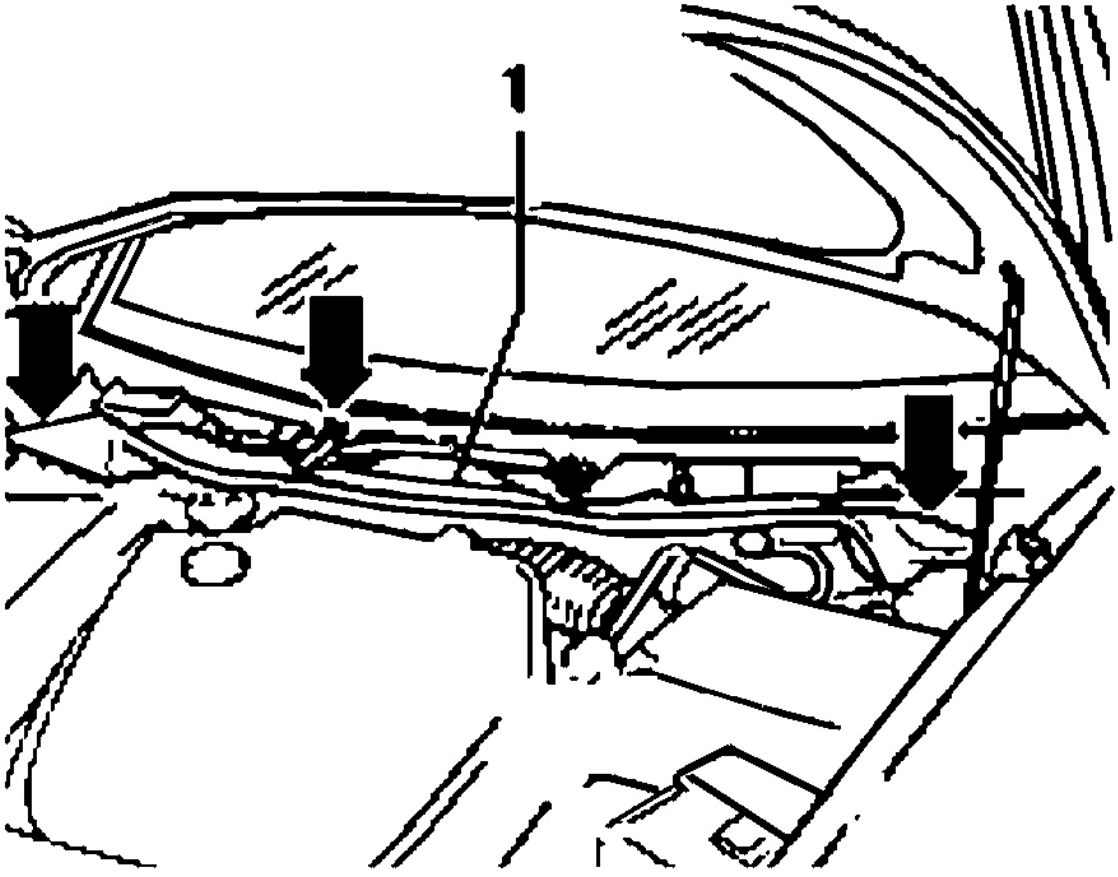

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Fig. 13: Removing & Installing Wiper Assembly (1 Of 2)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

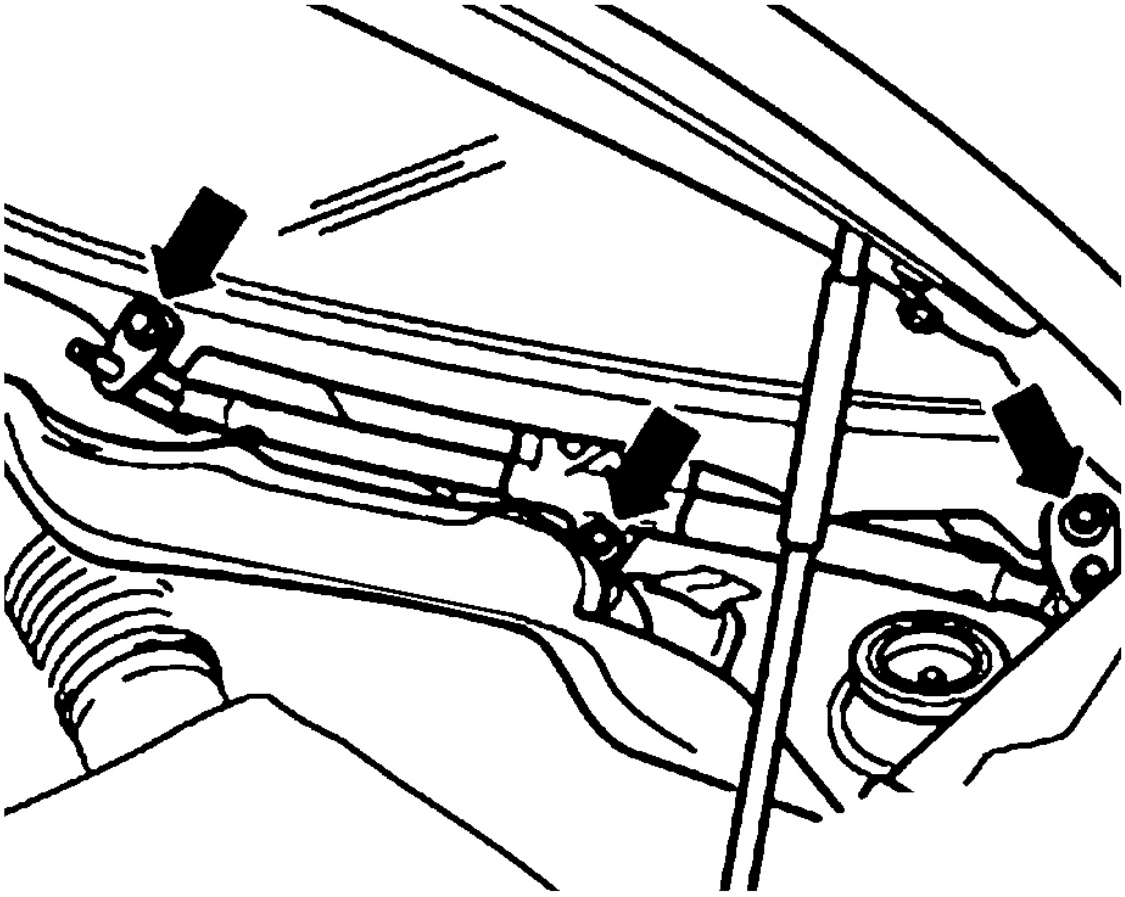

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Fig. 14: Removing & Installing Wiper Assembly (2 Of 2)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Installation

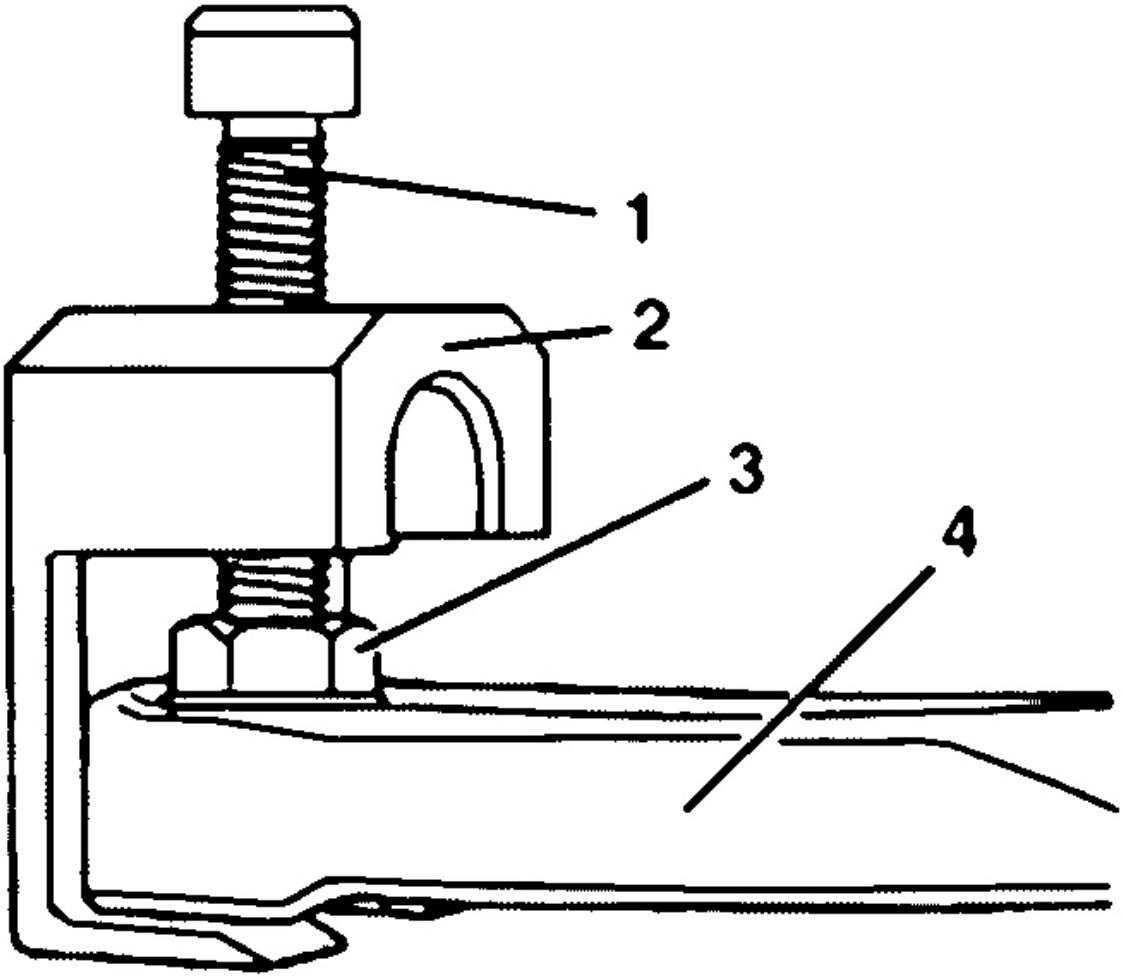
Ensure crank arm is in park position. See **WIPER BLADE PARK POSITION** under ADJUSTMENTS. Installation is reverse of removal procedure. Tighten fasteners to specification. See **TORQUE SPECIFICATIONS** .

WIPER ARMS

NOTE: Before removing wiper arms, ensure that wiper motor is in park position. This ensures proper wiper arm/blade park position when reinstalling.

1. Pry off wiper arm caps (arrows) with a screwdriver. See **Fig. 3** .
2. Loosen wiper arm nuts, but do not remove completely.
3. Rock wiper arms back and forth on shaft until wiper arm releases from shaft.
4. Remove nut completely and remove wiper arms. If wiper arm does not release easily from shaft after loosening nut, do not use force. Go to next step.

5. If wiper arm does not release easily from shaft, use the following procedure:
    - Place locating arms of Puller (T10130) under wiper arm as illustrated. See **Fig. 15** .
    - Turn spindle screw clockwise until it engages the wiper shaft and previously loosened nut (the nut serves as a centered guide for spindle).
    - Continue to turn spindle screw clockwise, until wiper arm releases from shaft.
6. To install, reverse removal procedure. Tighten fasteners to specification. See **TORQUE SPECIFICATIONS** .



(1) Spindle Screw
(2) Puller T10130
(3) Nut
(4) Wiper Arm

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Fig. 15: Removing Wiper Arm Nut Using Puller (T10130)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Component	Ft. Lbs. (N.m)
Wiper Arm Nut	15 (20)
Wiper Motor Crank Nut	15 (20)
	INCH Lbs. (N.m)
Wiper Motor Mounting Bolts	71 (8)

WIRING DIAGRAMS

See WIPER/WASHER in appropriate SYSTEM WIRING DIAGRAMS article in ELECTRICAL.